REMARKS

This paper is being submitted in response to the Office Action mailed September 8, 2009. Claims 1–7 and 9–13 are currently pending, with claim 8 cancelled without prejudice and claims 14–20 previously withdrawn as directed to a non-elected invention. Claim 9 is amended to clarify the scope of the claim. Support for the amendment is found throughout the specification. No new matter is introduced by this Amendment.

Claim Objections

The Examiner objected to claim 8 under 37 C.F.R. § 1.75(c) as being of improper dependent form. Without acquiescing in the Examiner's characterization of the claim, Applicants note that claim 8 has been cancelled without prejudice. The objection is, therefore, moot. Withdrawal of the same is respectfully requested.

Rejection under 35 U.S.C. § 112

The Examiner rejected claims 8 and 9 under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 8 is cancelled. With respect to claim 9, Applicants note the claim has been amended to omit trade names and to identify chemical compounds by their structural formulae. Applicants submit this obviates the rejection, and respectfully request withdrawal of the same.

Rejection under 35 U.S.C. § 103

1. The Examiner rejected claims 1–13 under 35 U.S.C. § 103(a) as obvious over Goodwin et al. (WO 03/086031) in view of Swihart et al. (U.S. Patent No. 4,447,499). Applicants respectfully traverse.

Goodwin et al. disclose an atmospheric pressure plasma assembly and methods for treating a substrate using the disclosed assembly (*see generally* Goodwin et al., at [00011]). The assembly includes a first and second pair of vertically arrayed, parallel spaced-apart planar electrodes with at least one dielectric plate between said first pair, adjacent one electrode and at

least one dielectric plate between said second pair adjacent one electrode. The spacing between the dielectric plate and the other dielectric plate or electrode of each of the first and second pairs of electrodes forms a first and second plasma region. The assembly further includes a means of transporting a substrate successively through said first and second plasma regions and an atomizer adapted to introduce an atomized liquid or solid coating making material into one of said first or second plasma regions (*see, e.g. id.*, at [0019]).

Swihart et al. describe adhesive-releasing silicone coatings, and methods for applying the coatings to substrate. The coating composition includes a polydiorganosiloxane compound of the formula $R_3SiO(MeQSiO)_x(Me_2SiO)_ySiR_3$, and a UV-radiation photosensitizer soluble in the polydiorganosiloxane (*see* Swihart et al., at col. 2, ll. 45–67). The composition is applied to the substrate and then cured by applying UV radiation. Swihart et al. also disclose paper and polymer materials coated by the methods of the invention (*see id.*, at col. 3, ll. 4–5).

Claim 1 recites a method for coating a substrate with an inorganic-organic hybrid polymer material using the Dielectric Barrier Discharge (DBD) technique. The method includes steps of introducing a sample in the space between two electrodes, controlling the atmosphere between the electrodes, generating a plasma discharge between the electrodes, and mixing aerosols containing hybrid organic/inorganic cross-linked pre-polymers formed via sol-gel processing, into the plasma discharge.

To make a *prima facie* case of obviousness, the teachings of the prior art should have suggested the claimed subject matter to the person of ordinary skill in the art, and all the claim limitations must be taught or suggested in the references cited by the Examiner. *In re Kotzab,* 217 F.3d 1365, 1370 (Fed. Cir. 2000). As articulated by the Supreme Court in a recent case, a combination is obvious if it is no more than the predictable use of known elements according to their established functions; and there was a reason to combine the known elements. *KSR Intl Co. v. Teleflex, Inc.*, 550 U.S. (2007). To make *a prima facie* case of obviousness, "it remains necessary to identify the reason why a person of ordinary skill in the art would have combined

the prior art elements in the manner claimed." *Id.* The initial burden to make *a prima facie* case of obviousness is on the Examiner. *In re Bell,* 991 F.2d 781, 783 (Fed. Cir. 1993). Applicants submit that the Examiner does not make a *prima facie* case of obviousness, because all the limitations of the present claims are not taught by the reference cited in the Office Action. Furthermore, Applicants submit the present invention is surprising and unexpected in view of the prior art.

The Examiner concedes that Goodwin et al. do not specifically teach how to make the precursors used to make a hybrid inorganic/organic pre-polymer as in the recited claims (*see* p.5, Office Action mailed September 8, 2009). Instead, the Examiner relies on the disclose of Swihart et al., and contends that because Swihart et al. describe preparation of siloxane coating compositions by conventional methods including sol-gel processing, a person of skill in the art would have found it obvious to form the polydimethylsiloxanes of Goodwin et al by a sol-gel process to arrive at the present invention.

Applicants disagree and submit that Goodwin et al. and Swihart et al. do not render claim 1 obvious, as the combination of references does not teach or suggest the use of hybrid organic/inorganic cross-linked prepolymers formed by sol-gel methods in combination with DBD plasma methods. Precursors produced by sol-gel processing have specific characteristics in the present invention and the skilled artisan would not have reasonably expected to be able to produce high quality coatings from these precursors, in view of the disclosures in the prior art references.

Different techniques for producing hybrid organic/inorganic materials are known (*see e.g.*, p. 1, l. 30 to p. 2, l. 4 of the present Application). The sol-gel process of the application is very specific, in that it produces a solution comprising precursors that have already undergone cross-linking reactions (i.e. "pre-polymers"), which are enhanced by the addition of stabilizers and catalysts (*see id.*, at p. 2, ll. 9–18). Organic coating materials typically do not exhibit the

high degree of cross-linking necessary for a high mechanical stability, scratch and abrasion resistance, high network density and good barrier properties (*see id.*, at p. 3, ll. 15–19).

The use of sol-gel processing to produce prepolymers enhances the simultaneous organic cross-linking and inorganic network formation during plasma coating (*see id.*, at p. 12, ll. 14–17). Sol-gel produced prepolymers are designed to have specific properties. The polymers to be functionalized can be selected to have the desired or specific properties (*see id.*, at p. 14, ll. 7–12, l. 26). The design is a consequence of the specifics of the sol-gel reaction, as described in the instant Specification (*see id.*, at pp. 12–13). The properties of the sol-gel derived systems made by the methods of the invention are unexpected in view of the disclosures in the prior art.

The Examples in the Specification describe the unexpected behavior of materials produced by the methods of the present invention. Briefly, the Examples illustrate precursor polymer solutions according to the present invention (*see id.*, at p. 19). Inorganic cross-linking due to condensation reactions occurs during plasma treatment. It was initially thought that the condensation reaction in sol-gel systems would start only at high temperatures and over a duration of several hours. However, it was unexpectedly and remarkably discovered that the methods of the present invention (using plasma exposition) allow such condensation reactions to occur at low temperatures and with very short treatment times (on the order of minutes) (*see id.*, at p. 19, ll. 11–18). This unexpected behavior is a new and unexpected result in view of the prior art existing at the time of invention, and could not be predicted from the prior art recited by the Examiner.

Therefore, in view of the above remarks, claim 1 is not obvious under 35 U.S.C. § 103(a) over Goodwin et al. and Swihart et al. The rejection has been overcome, and withdrawal of the same is respectfully requested.

Claims 2–7 and 9–13 depend directly from claim 1, and incorporate all the limitations thereof. The foregoing remarks demonstrate that claim 1 is not obvious over the cited

combination of references. Therefore, claims 2–7 and 9–13 are also not obvious over Goodwin et al. and Swihart et al. Withdrawal of the rejection of these claims is respectfully requested.

2. Claim 3 was additionally rejected under 35 U.S.C. 103(a) as obvious over Goodwin et al. in view of Swihart et al. as applied to claim 1, further in view of Chow et al. (U.S. Patent Pub. No. 2002/0031658). Applicants respectfully traverse the rejection.

The above discussion of Goodwin et al. and Swihart et al. is fully incorporated herein. Briefly, the combination of Goodwin et al. and Swihart et al. do not render claim 1 *prima facie* obvious, because the method of claim 1 demonstrates surprising and unexpected results in view of the prior art cited in the Office Action.

Claim 3 recites the method of claim 1, where the aerosol includes a compositional gradient of the pre-polymers and/or any additional admixed components. The claim depends directly from claim 1 and incorporates all the limitations of that claim.

As indicated above, the condensation reactions in the present invention unexpectedly occur at low temperatures and with very short treatment times, and therefore, Goodwin et al. and Swihart et al. do not render the claim *prima facie* obvious. As claim 3 depends directly from claim 1, the claim is also not obvious over Goodwin et al. and Swihart et al. Further, the Examiner concedes that the combination does not teach or suggest the formation of multilayer coatings in a plasma treatment.

Chow et al. describe spray deposition of liquid precursor coating material onto a substrate (*see* Chow et al., at paragraphs [0013]). The methods in Chow et al. are described as "suitable for producing multilayer materials." A fine composition gradient can be formed by varying the composition of the precursor composition (*see id.*, at Abstract and paragraph [0027]).

However, Chow et al. do not teach or suggest the invention of claim 3, as the reference does not cure the deficiencies of Goodwin et al. and Swihart et al. with respect to claim 1. Specifically, there is nothing in Chow et al. that would suggest formation of the precursor

polymers at conditions of low temperature and in a very short period of time using a plasma technique. Therefore, the result of the method of claim 1 remains unexpected and surprising in view of the combination of Goodwin et al., Swihart et al., and Chow et al. Claim 3 is therefore similarly unexpected and not *prima facie* obvious over the cited references.

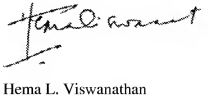
In view of the above remarks, claim 3 is not obvious under 35 U.S.C. § 103(a) over Goodwin et al. and Swihart et al. The rejection has been overcome, and withdrawal of the same is respectfully requested.

SUMMARY

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

MERCHANT & GOULD P.C.
P.O. Box 2903
Minneapolis, Minnesota 55402-0903
(612) 332-5300



Date: January 8, 2010

Hema L. Viswanathan
Reg. No. 62,932
GAS:HLV:jrm

23552
PATENT TRADEMARK OFFICE